#### (12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

# (19) World Intellectual Property Organization

International Bureau



### 

### (43) International Publication Date 2 June 2005 (02.06.2005)

**PCT** 

## (10) International Publication Number WO 2005/049245 A1

(51) International Patent Classification<sup>7</sup>: 26/06

B21D 26/02,

(21) International Application Number:

PCT/US2004/038172

(22) International Filing Date:

15 November 2004 (15.11.2004)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

60/520,868

17 November 2003 (17.11.2003) US

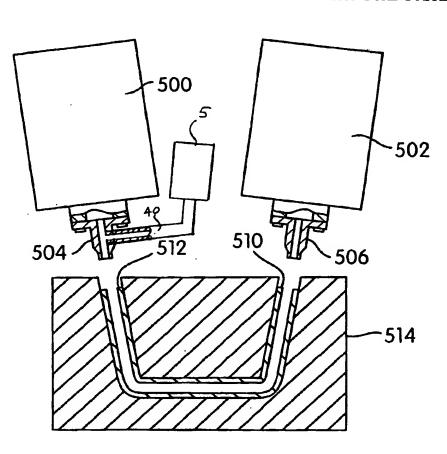
- (71) Applicant (for NA, US only): MAGNA INTERNA-TIONAL INC. [CA/US]; 1807 East Maple Road, Troy, MI 48083 (US).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): NOTTROTT, Arndt

[DE/DE]; 21 Fliethgraben, Toenisvorst 47918 (DE). SANS, Brent, C. [CA/CA]; 127 Arthur Street, Komoka, Ontario NOL 1R0 (CA).

- (74) Agents: HILLIARD, Thomas, P. et al.; Pillsbury Winthrop LLP, P.O. Box 10500, McLean, VA 22102 (US).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,

[Continued on next page]

(54) Title: HYDROFORMING USING HIGH PRESSURE PULSATION DURING FLUID INTENSIFICATION CYCLE



(57) Abstract: A method and apparatus for hydroforming a metal part includes placing a part to be formed (510) within a die (512), closing the die to enclose the part to be formed, and introducing a high pressure fluid to an interior of the die for expanding the part against an interior surface of the die. The high pressure fluid has a pulse applied thereto for increasing a material flow of the part within the die.

WO 2005/049245 A1

#### WO 2005/049245 A1



ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

#### Published:

with international search report

 before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.